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ABSTRACT

This paper focuses on the problems of comparative educational research in developing societies and suggests theories for a new cross-cultural typology for schools related to four modes of instruction: memorizing; training; intellect developing; and problem solving. For ease of comparison, the descriptions of the types are classified under the same seven readings: 1) Sources of the best curriculum; 2) Character of the goals; 3) Curriculum content; 4) Learning activities; 5) Teaching methods; 6) Tests of success; and 7) Anticipated outcomes. The purpose of the theory construction presented in this paper, is to make the concept of formal education a more meaningful variable in studies of the political, economic, and social uses of schooling for national development. The purpose of projecting hypotheses is not only to demonstrate the fruitfulness of the theories presented but also to stimulate the composition of alternative hypotheses and systematic efforts to verify or falsify all such hypotheses. Social and cultural factors, rather than economic aspects are the underlying focus of concern in this study. (FDI)

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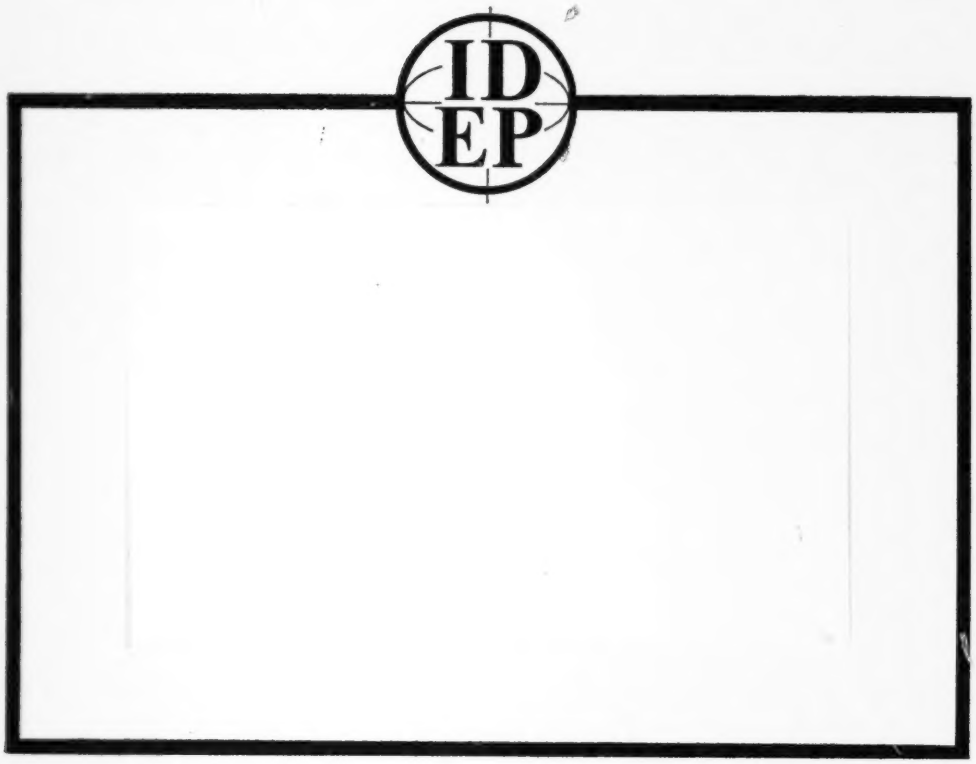

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TYPES OF SCHOOLING FOR DEVELOPING NATIONS

by

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Occasional Paper

of the

International and Development Education Clearinghouse

School of Education

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FOREWORD

In the summer of 1965, the Institute of Advanced Projects at the East-West Center, University of Hawaii, invited sixteen scholars to discuss "Cultural Factors in Educational Change." As one of a series of International Development Seminars, the group spent three weeks at the East-West Center under the direction of Dr. Cole Brembeck, Director of the Institute for International Studies in Education at Michigan State University. During that time, professional educators and social scientists exchanged research findings and ideas in an area of development education that had received little previous attention. Social and cultural factors, rather than economic aspects, were the focus of concern.

Professor Thomas' paper, reproduced here as it was presented at that Seminar, contributes the perspective of an educational philosopher to the problems of comparative educational research in developing societies by suggesting a new cross-cultural typology for schools related to four modes of instruction. He describes four possible patterns of curriculum sources and content, learning activities, methods of teaching and evaluation, and anticipated outcomes.

Graduate students from the University of Pittsburgh's International and Development Education Program in an advanced seminar in "Development Education and Applied Anthropology" found Professor Thomas' typology especially provocative in suggesting future directions of inquiry. For this reason, and with Professor Thomas' permission, we are reproducing this paper as an Occasional Paper of the International and Development Education Program Clearinghouse.

John Singleton, Chairman
International and Development Education Program

May 1968

Chapter I

IDENTIFYING SIGNIFICANT EDUCATIONAL VARIABLES

The planned use of formal education as an instrument for national development in the less-industrialized nations of the world has attracted the attention, not only of professional educators, but of anthropologists, sociologists, economists, and political scientists as well. The urgent demand is for sound, expert judgments concerning the strategies each nation should employ in this venture, and all of these specialities have been asked for prescriptive proposals in recent years. But the persisting need is for empirical evidence and tested generalizations on the relations of various educational arrangements to the culture, social structure, politics, and economy of the countries concerned. This kind of scientific information, especially if it is organized into a coherent discipline, can provide a solid foundation for prescriptive judgments on educational strategies.

Each of the behavioral sciences mentioned above has succeeded in developing some sets of operationally defined categories and variables which constitute the conceptual tools of that science. Without such a development, there could have been no science. Education, which is a professional art, draws heavily upon the findings of the behavioral sciences but has not felt the obligation of the sciences to define its concepts and categories with such operational precision. An art can get along fairly well with a good measure of shared insights, disciplined institutions, and ad hoc empirical findings. However, the emergence of a new professional discipline (which may inherit the old title of Comparative Education or acquire a new one like Development Education) calls for more care and precision in identifying and defining its key concepts than educators have been disposed to give heretofore.

This neglect has handicapped the behavioral scientists in their initial researches in this area, but it hasn't stopped them. From lack of indications to the contrary, some have been willing to assume that schooling is a kind of homogeneous quality, varying only quantitatively in number of years. If this were true, such questions as these would be meaningful to investigate:

1. What is the relation of national productivity to the number of years of required attendance in school?

2. What is the relation of the percentage of "educated unemployed" to the proportion of youth graduating from senior high school?

3. What is the relation of the percentage of registered voters participating in a national election to the average grade achievement of the adults 25 years of age or older?

Each of these questions assumes the homogeneity of education--i.e., that in education given in one elementary school is equivalent to that given in another, and that 10 years of schooling taken here is equivalent to 10 years taken there. This assumption is precarious even for schools in the same locality, and becomes extremely dubious for comparisons between different regions. For international comparisons, it becomes grotesque.

Other behavioral scientists have tried to distinguish different qualities of schooling. A recent study of the United States, Sweden, and Japan asked the relation between rate of economic growth and the amount of time that the students in these countries spent in five kinds of schooling:

1. Communication skills (reading, speech, grammar, foreign language)
2. Mathematical tools
3. General enculturation (social sciences, natural sciences, art appreciation)
4. Economic productivity (vocational and professional courses)
5. Personal, social capacities (physical education, military training, art activities, etc.)

This is a hopeful start into virgin territory, but do these classifications express the significant differences in quality of education that are worth correlating with economic and political variables? Is "general enculturation" in Sweden, for example, functionally similar to "general enculturation" in Japan? We cannot be confident without much clearer definitions and a cogent theory for identifying significant variables.

Another study interpreted "quality of education" in terms of degrees of betterness. It sought the connection between economic productivity and two measures of this kind of educational quality:

1. Pupil-teacher ratio (the lower the ratio, the higher the quality of schooling)

2. Proportions of males and females on the teaching staff (the more males, the better the quality of schooling)

These indices suggest a plausible validity on their surface and are probably easy to quantify from available statistical reports, but they rest on uncriticized assumptions and present plausible rationalizations rather than rational theories to support their significance. Can professional educators identify the really important differences in the character of formal education between localities, regions, or nations, and define them with sufficient clarity so that social scientists can relate them to various cultural, social, economic, and political variables?

This question has not been of urgent concern to most educators in the past. When they have been interested in quantitative comparisons, their attention has been focused on specifics--the effects of different kinds of teaching techniques, the effects of different types of subject matter, or the effects of different teacher personalities. Comparisons between schools

have been largely limited to differences in pupil scores on standardized achievement tests. Quantitative comparisons on an international scale, where differences in language rule out the use of the same achievement tests, have been tenuously based on finding out whether the students of a specified age in one country are studying more advanced content in mathematics or science than their age-mates in another country. This comparison is valid if the schools of the two nations are equally selective of students and similarly dedicated to rapid advancement in this kind of academic achievement.

But what about the character of vocational education, preparation for citizenship, economic education, schooling in the humanities, and so on in these different countries? Our knowledge is largely limited to the pre-scientific descriptions of how various aspects of formal education developed in a number of countries. This contribution has come from the traditional conception of comparative education. It has been rich in qualitative details and trends, but has provided little basis for quantitative comparisons between nations. We know something about the types of schools, the kinds of curricula, and the numbers of students enrolled, but we are comparatively ignorant of what goes on in these schools, how the subject matter is selected, how the students are taught, and what immediate outcomes are sought in the examinations. Modern educators are well aware of the importance of comparing the effects of these differences and have conducted local experiments between different classrooms and between different schools, but they have only started to attack the problem on an interregional or international scale.

A possible first step in a systematic response to this problem is to identify major kinds of schooling according to the educational theories that determine their distinguishing characteristics. The rationale of this tactic is twofold. When an educational theory is used to select the salient features of a type of instruction, whose features will be significant, first of all, in making up a coherent pattern of educational effort. Hence, they will have intrinsic significance with the type. For comparative purposes, however, the features of one type of instruction will also be selected for clearest distinction from those of another type. Thus they will have extrinsic significance for distinguishing among types. The educational features which satisfy these two criteria may or may not prove to possess significant relationships to social, economic, and political factors, but at least they possess an important kind of educational significance.

Four theories of instruction are briefly described in the following pages as types of schooling--memorizing, training, intellect developing, and problem solving. Even a hasty reading should be convincing that these are significantly different kinds of education. For ease of comparison, the descriptions of the types are classified under the same seven headings, but no claim is made that any of the headings is a significant educational variable by itself. Only the composite type is claimed to be an important meaning of formal education, not only because each type has its own integrity, distinctive emphases, and logical coherence. Readers are invited to judge whether the classrooms, schools, and school systems they have known tend to fit one rather than another of these schooling types.

FOUR TYPES OF SCHOOLING

Type M - MEMORIZING

Suggested Illustrations

a. Grammar schools of colonial New England
b. Academic schools of Korea, Thailand, Taiwan, etc.
c. The Koran schools in Muslim countries
d. The Yobiko "cram schools" in Japan preparing for admission examinations to high school and college

Identifying Principles

1. Sources of the best curriculum (when all subjects are to be memorized)
   1.1 The best of the past.

2. Character of the goals
   2.1 Values claimed
      2.11 The best of the past is inherently worth learning.
      2.12 The fewer uses a study has, the higher its intellectual value.
   2.2 Breadth of development sought
      2.21 Efficient memorizing of the best in the cultural heritage is facilitated by the cultivation of certain character traits--persistence, obedience, respectful silence, deference to elders, etc.
   2.3 Goal definition
      2.31 Traditional examinations define the relevant material to study.

3. Curriculum content (when the entire school is committed to this type of instruction)
   3.1 General Organization
      3.11 Curriculum often consists of classical literature, ancient philosophy, authoritative history, mathematical computation, descriptive science, principles of moral conduct.
         3.111 Could consist of recent conclusions in natural science, social science, and humanities if appropriate to memorizing.
      3.12 A variety of subjects is commonly offered, but one principal skill is demanded--precise recall.
   3.2 Study materials
      3.21 Consists chiefly of long classical writings, models to imitate, lecture notes, and textbooks of long-established worth
      3.22 Seldom more than one textbook in a subject is studied at a time.

4. Learning activities
   - 4.1 Basic method
     - 4.11 Rote memorizing
   - 4.2 Student activities
     - 4.21 Chiefly listening, observing, reading, reciting, and writing.
     - 4.22 Class discussions rarely occur, and questions from students are discouraged.
   - 4.3 Locus of student activities
     - 4.31 Generally confined to the classroom and the library. The instructor has no concern nor responsibility for student activities that may go on outside these formal settings.

5. Teaching methods
   - 5.1 Teacher activities
     - 5.11 To lecture, conduct recitation, give assignments, and examine.
       - 5.111 Lectures are often a substitute for unavailable textbooks. When used, lectures are didactic and are to be copied verbatim in students' notes.
   - 5.2 Motivation of students
     - 5.21 Becoming educated is an austere and exacting process; interest in it is an obligation of educable students.
     - 5.22 In practice, however, the threat of failure is the chief source of motivation.
   - 5.3 Control of student conduct
     - 5.31 Student habits of obedience, deference, and undivided attention are essential and must be strictly enforced by the teacher.
   - 5.4 Provision for individual differences
     - 5.41 Students in the classroom customarily engage in the same learning activities at the same time.

6. Tests of success
   - 6.1 Chief expectation
     - 6.11 Precise reproduction of facts and principles when specifically demanded.
   - 6.2 Relation to practice
     - 6.21 Intellectual knowledge is simple possession of correct ideas; no relation to action or practice, except in taking examinations.
   - 6.3 Sources of evidence
     - 6.31 Extensive use of oral recitations and written examinations.

7. Anticipated outcomes
   - 7.1 An accurate and precise memory; disciplined obedience.
   - 7.2 A well-stocked mind; intellectual conformance.
   - 7.3 Reverence of the past; resistance to change.
   - 7.4 Satisfaction of possessing classical learning for its own sake.

Type T--TRAINING

Suggested Illustrations

a. Most secondary-level vocational (agricultural, industrial, commercial) in most countries.
b. Normal schools for teachers (U. S. type in 1900).
c. Speech institutes, barber school, stenographic school.
d. Foreign language instruction, especially when focused on oral fluency.

Identifying Principles

1. Sources of the curriculum
   1.1 The current (and sometimes anticipated) tasks or needs in some adult activity in the present society (or the immediate future).
      1.11 For moral training, the sources are usually scriptual and traditional.

2. Character of the goals
   2.1 Values claimed
      2.11 In general education, enabling children to learn to do better what they will have to do (or ought to do) anyway.
         2.111 In this instance, it is appropriate to analyze adult activities for the needed skills and attitudes to be learned by the students, thus producing competence in certain responsibilities (health habits, morality and ethics, political behavior, family roles, etc.) rather than developing a marketable skill.
      2.12 In vocational education for a particular set of skills, general goal is the achievement of employable competence at the time of graduation.
   2.2 Breadth of development sought
      2.21 The focus is on developing a specific set of skills accompanied by appropriate attitudes, but typically without intellectual depth.
   2.3 Goal Definition
      2.31 The requirements for developing the skill, instead of the interests of the learners, determine the curriculum content. Hence, the specific goals within this framework are set by the instructor and prescribed for the students.

3. Curriculum content
   3.1 General organization
      3.11 Usually each set of skills is broken into its essential components for separate treatment. Often each component is further analyzed to facilitate drill on particular parts.
   3.2 Study materials
      3.21 Extensive use is made of (a) manuals of directions, blueprints, recipes; (b) models, miniature job situations, and modern equipment appropriate to the skill.

4. Learning activities
   - 4.1 Basic method
     - 4.11 Habituating specific skills and attitudes in action
       - 4.111 The theory of "why" of the skill may be ignored or studied in a separate "theory class."
   - 4.2 Student activities
     - 4.21 Much use is made of observation, imitation, drill, and supervised practice.
   - 4.3 Locus of student activities
     - 4.31 Formal class activities are usually subordinate to shop work, laboratory work, miniature demonstrations, and on-the-job training.

5. Teaching methods
   - 5.1 Teacher activities
     - 5.11 To serve as model, make assignments, conduct drill, supervise practice, suggest improvements, locate on-the-job opportunities, recommend students to prospective employers.
   - 5.2 Motivation of students
     - 5.21 Since emphasis is placed on performance rather than study and since the choice of training programs is usually voluntary, the motivation is often intrinsic (enjoyment of work itself) and/or extrinsic (the paid job leads to). However, differences in student interests are seldom allowed to influence the nature of the skills to be acquired nor the standards to be met.
     - 5.22 For training in unpaid activities (e.g., morals, health habits, political behavior), the motivation varies from artificial rewards (gold stars, special privileges) through group pressures for conformance (expectations of the family, exciting political rallies) to actual punishment (physical abuse, isolation).
   - 5.3 Control of student conduct
     - 5.31 The teacher sets the rules for proper conduct (and proper use of equipment), and enforces the penalties for any violations.
   - 5.4 Provision for individual differences
     - 5.41 Every student is expected to master the same required competences up to a predescribed level of proficiency.

6. Tests of success
   - 6.1 Chief expectation
     - 6.11 Sufficient competence in a skill for immediate employment (or, as in the case of unpaid skills, to satisfy the standards of performance set by the teacher or higher authority).
   - 6.2 Relation to practice
     - 6.21 Knowledge is proved by performance; no separation of knowing and doing.

6.3 Sources of evidence

6.31 Demonstrated performance in trial situations at a specified level of competence is much preferred over written tests.

7. Anticipated outcomes

7.1 Automatic habits and well-conditioned attitudes.

7.2 Precision in execution, fidelity to the model.

7.3 Freedom from deviation, innovation, and inquisitiveness.

7.4 A high quality product from the skill.

Type D-I--DEVELOPING INTELLECT

Suggested Illustrations

a. Most U. S. high schools and colleges (academic programs)
b. The French Lycée
c. The German gymnasium
d. British academic secondary schools

Identifying principles

1. Sources of the curriculum
   1.1 The range of subjects is largely limited to the contemporary conception of the liberal arts, because they are believed to be generative of life-long learning and to discipline the mind.

2. Character of the goals
   2.1 Values claimed
      2.11 The immediate values of the study of these subjects are intrinsic (develop the intellect), preparatory (the foundation for competent living), and individualized (each student is left free to make whatever application of his learning he chooses).
      2.12 The value of a subject for intellectual development is inherent and is not found in its possible applications or possible uses.
   2.2 Breadth of development sought
      2.21 Within each subject, the intent is to develop in each student the basic equipment and subject familiarity needed by a prospective specialist in that field.
   2.3 Goal definition
      2.31 The specific goals within this framework are set by the instructor (or higher authority) and prescribed for the students.
3. Curriculum content
   3.1 General organization
      3.11 The content consists of selections from the standard arts and sciences--i.e., the natural sciences, the social sciences, the humanities, and the formal disciplines (mathematics, grammar, logic).
         3.111 Some adaptation may be made at the primary grades where children are just acquiring their verbal and computational skills, but in all higher grades these subjects are to be studied systematically according to the internal order scheme of each field (e.g., chronology for history, simple to complex for grammar).
         3.112 The performing arts (music, painting, drama, athletics, etc.) are often encouraged (to develop character and a balanced personality), but they stand on the periphery of the curriculum (i.e., they seldom receive any academic credit or marks). They can become part of the D-I academic program, only as history of or as musicology, aesthetics, kinesiology, etc.

3.2 Study materials
3.21 Consist chiefly of textbooks, which are modern, and often additional reference books.
3.211 A Classically oriented version is the 100 Great Books recommended by Mortimer Adler.
3.22 Study resources may also include audio-visual equipment and field trips into the community, but only when these aids are more efficient in promoting a knowledge of the subject than the usual class and homework.

4. Learning activities
4.1 Basic method
4.11 Reflective study of essential ideas to achieve some command of an organized discipline.
4.111 In some subjects a type of problem solving is used: the teacher locates and defines the problem, and then assigns it to the students to solve.
4.2 Student activities
4.21 Most frequently they are listening, observing, reading, and writing, but they may include reciting, discussing, questioning, solving predefined problems, and doing laboratory work according to a manual.
4.3 Locus of student activities
4.31 The above activities may occur just as appropriately outside of the class as in, but the greatest educational value is realized when these activities focus on questions within the structure and content of the subject being studied instead of on practical applications or current social problems.
4.32 Extra-class activities expressing the social and recreational interests of students are usually permitted but are seldom regarded as making a serious contribution to the academic curriculum.

5. Teaching methods
5.1 Teacher activities
5.11 Major features of the teacher's role include lecturing to supplement the textbook, presenting demonstrations, questioning students' ideas, inviting questions of interpretation, composing assignments and examinations.
5.2 Motivation of students
5.21 If the student finds enjoyment in his studies, this is a fortunate by-product to be welcomed but not to be made a central intent in curriculum selection.
5.22 Most students require extraneous motivation (marks, honors, privileges, threats) to study what they should and to do their best. The teacher may use rewards as freely as punishment.
5.221 The motivation is considered an aid to learning but not a part of the knowledge acquired.

5.3 Control of student conduct
5.31 The teacher usually sets the standards for proper conduct and enforces the penalties. In some situations, however (such as during examinations), the students may be permitted to administer the established rules and to report violations, sometimes even recommending the proper punishment to the teacher. The classroom atmosphere should be quiet, orderly, and attentive to work.

5.4 Provision for individual differences
5.41 The curriculum content may be varied in quantity for fast, medium, and slow learners, but the students in each group customarily study the same materials at the same time.

6. Tests of success
6.1 Chief expectation
6.11 Being able to cite and think like a beginning specialist in each subject studied.

6.2 Relation to practice
6.21 Knowing precedes doing; the school is responsible for only the intellectual activities of knowing (except when skill training is combined with knowning, as in mathematics, science laboratories, and written composition).
6.211 Learning to know is conceived as education; learning to do is conceived as training.

6.3 Sources of evidence
6.31 Examinations, term papers, oral quizzes, etc., on the concepts, inner relationships, and methodology of the discipline.

7. Anticipated outcomes
7.1 Disciplined habits of thinking and mental acuity.
7.2 Intellectual curiosity and inquisitiveness; devotion to life-long learning
7.3 Readiness to attack adult p oblems (later) with understanding and insight.
7.4 Systematic understanding of the good, true, and beautiful in the cultural heritage; reverence for scholarship.

Type P-S--PROBLEM SOLVING

Suggested Illustrations

a. Some elementary classrooms in the U. S. (a minority)
b. A few progressive private schools in the U. S.
c. Experimental programs in science teaching, selected elementary schools in the Philippines (Orata)
d. Small Industry Extension Training, Hyderabad, India
e. The advanced proposals of most curriculum theories in the U. S.

Identifying Principles

1. Sources of the curriculum
   1.1 Representative selection from the range of public and personal problems of current concern to adults and to children.
2. Character of the goals
   2.1 Values claimed
      2.11 The general goals of schooling are set by the core values of a society and the nature of the problem-solving process. For example, the major responsibilities of teaching include:
         2.111 Developing problem-solving competence through experiences in seeking solutions to personal and community problems.
         2.112 Promoting intellectual interests and competence through encouraging the "why" spirit in all learning activities (not just through special subjects).
   2.2 Breadth of development sought
      2.21 Promoting the discovery of cultivated enjoyments (which are both the justification for and the consummation points of all problem solving).
      2.22 Developing democratic self-concepts and socialized personalities (an essential condition for continued problem solving).
   2.3 Goal definition
      2.31 The specific goals within this framework are determined cooperatively and critically by the students and teacher in interaction (instead of given by higher authority).

3. Curriculum content
   3.1 General organization
      3.11 Large blocks of time devoted to major areas of problems--family, civic, recreation, vocation, consumership, health, etc. These areas enter the curriculum, not as content to be studied, but as "arranged environments" to provoke serious interests and to serve as possible resources as students pursue such interests.

3.12 Learning an organized discipline is seldom a starting point (except for precocious youngsters who see such study as their problem to solve). However, after extensive problem-solving experiences using materials from a standard discipline (historical materials, for instance, or chemical materials or grammatical materials), the majority of students, it is believed, will eventually seek a systematic command of the discipline itself.

3.2 Study materials

3.21 The study resources used are distinguished by (a) a large number of reference materials, (b) extensive use of the out-of-class environment, (c) large amounts of subject matter held in reserve as "resource units" for possible use whenever the course of student problem solving demands them.

4. Learning activities

4.1 Basic method

4.11 Problem solving conceived as involving all the following steps:

4.111 Direct experiencing of an indeterminate situation (puzzling, intriguing).

4.112 Defining this problem (setting the goal).

4.113 Collecting relevant data (from books, lectures, observations, interviews, field trips, etc.) and generalizations from past experience.

4.114 Organizing the data in promising ways (e.g., as hypotheses for testing).

4.115 Trying out hypothetical solutions to the problem (i.e., actual ways to reach the goal).

4.116 Drawing conclusions and generalizations (in the light of satisfactions and disappointments experienced).

4.2 Student activities

4.21 In addition to listening, observing, reading, writing, and generalizing, the problem-solving process calls for such distinctive student activities as locating problems, defining problems, committee work and group projects, systematic activities in the community, and trying out ideas in action.

4.3 Locus of student activities

4.31 In a problem-solving context, understanding arises from experiencing the "what," "how," and "why" in functional (active) relationships. This kind of activity cannot and should not be confined to the classroom or even the school grounds, but properly extends to the home and community.

4.32 Extra-class activities like student government, school clubs, and social affairs are considered to be as educationally significant as in-class activities and also an excellent source of certain kinds of problems to be solved.

5. Teaching methods
   5.1 Teacher activities
      5.11 Teaching is conceived as the stimulation and guidance of student inquiry. Thus, while there are occasions for lectures and teacher-led discussions, most of the teacher's time is spent in the roles of data collector, resource explorer, environment arranger, alternative suggester, procedural assistant, expediter, critic, and questioner.
         5.111 The students retain the ultimate responsibility for defining the specific problems to be solved, although the teacher stimulates new interests, purposes alternatives, and criticizes student choices.
   5.2 Motivation of the students
      5.21 In the light of the first two steps in problem solving, the motivation is characteristically intrinsic rather than than extraneous. A consummatory enjoyment is the normal purpose and anticipated conclusion of problem solving.
      5.22 The students' purposes are believed to become part of the knowledge learned (e.g., the kind of motivation which induces students to learn about nutrition becomes an attitudinal part of what they know about nutrition.)
   5.3 Control of student conduct
      5.31 Most of the classroom rules are composed cooperatively, in the light of experienced problems, and enforced jointly, often through elected student officers.
      5.32 A pragmatic attitude is taken toward student movements and noise, restricting them only to a fair consideration for others.
      5.33 Review and revision of regulations occur frequently, being regarded as further opportunities for significant problem solving.
   5.4 Provision for individual differences
      5.41 The curriculum content may vary both in kind and in amount according to the interests and talents of different groups of students in the class.
      5.42 Since a variety of student goals is encouraged, only occasionally (e.g., utilizing a resource speaker, evaluating progress) are most students in the class doing the same thing at the same time.

6. Tests of success
   6.1 Chief expectation
      6.11 Enhanced student competence in identifying, defining, and solving new problems. Also eventually, an organized understanding of the disciplines from which he has previously drawn the chief means of his problem solving.
   6.2 Relation to practice
      6.21 Knowledge is proved by performance; no separation of knowing and doing.
      6.22 What a student knows is what he can actually do (including reciting accurately and writing acceptable papers as well as choosing a different diet or petitioning the city council for changes in the traffic regulations).

6.3 Sources of evidence
6.31 Minimal use of paper-and-pencil tests; extensive use of actual or miniature problem situations.

7. Anticipated outcomes
7.1 Self-discipline learned from overcoming natural obstacles to the satisfying solution of one's own problems.
7.11 Enhances self-confidence and responsibility for self-direction.
7.2 Enthusiasm for innovation, creativity, and qualitative differences among persons.
7.3 Readiness and competence to continue investigating the problems of a changing society.
7.4 A broadly pragmatic attitude toward values, standards, rules, and truth.
7.41 Seeing traditions and the past as chiefly resources for present problem solving and future planning.

Chapter 2

RELATING TYPES OF SCHOOLING TO OTHER EDUCATIONAL VARIABLES

Significance of knowing the prevailing types. These four types of schooling can be used as frames of reference in comparing the world of two schools or even the work of two different classrooms. One way is to hold the type of instruction constant while other factors are varied. Thus, for example, this question could be investigated: When the type of instruction is developing the intellect (D-I) in all classes, what are the comparative effects of using teachers with different kinds or different lengths of professional preparation? Another way is to vary the types of instruction to discover their effects on a common, desired outcome. Thus, for example, what are the comparative effects on interest in self-directed study when matched groups of students are immersed for a year in, respectively, the memorizing, intellect developing, and problem-solving programs?

Most comparative research of an international character, however, requires much larger groupings of schools--e.g., all the rural elementary schoolf of Japan or all the private secondary schools of the Philippines. Let us assume for the moment that these schools can be identified with an instructional type and note the significance of this information for the interpretation of other educational variables. For instance, what is the significance of percentages of an age-group enrolled in the schools of two different countries? If the instructional type is the same for both sets of schools at this age level, the country with the largest percentage enrolled is likely to be more civilized, wealthier, or more committed to equal opportunity. If the percentages enrolled are similar, but if one country operates chiefly vocational training schools for this age group while the other provides only classical memorizing schools, our attention is immediately directed to possible differences in interactive effects between the schools and the social class structure, economic development, and readiness for modernization.

The dependence of our interpretations on a knowledge of the instructional type extends to other factors in similar fashion. What does a comparison of enrollment by sex mean unless we first know the type of schooling offered? The ratio of library books per student is very significant for D-I instruction but much less so for Type M instruction. The average years of schooling attained by a nation's adults in an ambiguous statistic without knowledge of the kind of school and the type of instruction provided. Even a comparison of the ave age expenditures per pupil can be misleading when one budget is for memorizing schools and another for problem-solving schools. A fair generalization is that most of the educational variables of interest to economists, political scientists, and sociologists acquire discriminating significance only after they are related to definite types of schooling. The following list is farily comprehensive of the range of such educational

variables. Please inspect each item with two questions in mind: (a) Could the school systems of two regions (or nations) be significantly compared on this item without knowing which of the four types of schools predominate in each region? If not, place a check in front of the item, and consider the second question. (b) Would the significance of the comparison be much enhanced if one knew which of the four types of schools predominate in one region and which in the other? If the answer is affirmative, place a second check in front of the item.

Variables Presumably Dependent on School Type

1. Average daily attendance (by age group or school level)
2. Ratio of school attendance to school enrollment
3. School enrollments by sex
4. Regularity of schooling (full-time, part-time)
5. Levels of schooling provided (grade levels)
6. Percent of graduates from one level continuing to the next level
7. Percent of drop-outs by grade level
8. Median years of schooling possessed by the adult population
9. Average number of hours of schooling per student per year
10. Total number of years of compulsory schooling
11. Proportions of students in public and private schools
12. Types of curricula (scientific, technical, humanities, commercial, military, etc.) and proportions enrolled in each
13. Frequency of curriculum revisions
14. Subjects required for graduation
15. Proportion of student time permitted for electives
16. Average hours of homework expected
17. Types of national examinations and proportions of failures
18. Major fields of those attending post-secondary institutions (by percentages of enrollment)
19. Special schools and curricula provided for gifted and handicapped children
20. Ratio of counselors to students
21. Ratio of library books to each student
22. School size and location (urban, suburban, rural)
23. Type of school control (public or private, local or centralized)
24. Background and qualifications of prospective teachers (social class, IQ, etc.)
25. Professional preparation of teachers (type, location, and amount)
26. Teachers salaries (starting and median)
27. Percentage of budget (or of national income) allotted to schooling
28. Capital investment in school plant and equipment
29. Average expenditures per pupil
30. Investment in learning aids per pupil (books, maps, models, films, laboratory equipment, etc.)

Very little evidence exists on the empirical relationships of the above items, either to the external variables of interest to anthropologists, sociologists, economists, and political scientists, or to the range of outcomes commonly desired by professional educators. Too often the worth

of an item is merely assumed or considered self-evident--e.g., the inherent superiority of full-time secondary schooling over part-time schooling combined with employment, or the self-evident value of higher salaries for teachers. However, interest in securing genuine evidence is growing, and if professional educators don't do their part in obtaining such evidence, the behavioral scientists will probably try to do it for them--with much less initial understanding of the intricacies of organized education.

Preparation for this task will require attention to all the following considerations:

1. Each item should be defined as precisely as possible in operational terms to clarify one's own understanding and to maximize the prospect of accurate communication.

2. After operational definition, each item that remains unchecked above should be reviewed once more for its possible dependence on being associated with one type of school or another before meaningful comparisons between regions can be made with it. If the independence still seems clear, the items should be transferred to the category of variables to be discussed below.

3. The thirty educational features listed above are presumed to be dependent, for their comparative meaning, on representing the same type of school. Beyond this criterion, they lack any theoretical grounds for being considered educationally significant variable. To avoid the endless listing of possible features, we need sub-theories under each school type that will organize these features into coherent patterns of educational significance. For example, the relative importance of such variables as 1 (average daily attendance), 3 (school enrollment by sex), 4 (regularity of schooling), 5 (levels of schooling provided), 6 (percent of graduates from one level continuing to the next), 7 (percent of drop-outs by grade level), 9 (average number of hours of schooling per student per year), and 10 (total number of years of compulsory schooling) probably depends on a cogent statement of the social purposes of organized schooling. Similarly, a coherent theory of the structure and function of the curriculum is needed before we can assess the relative importance of such items as 12 (types of curricula), 13 (frequency of curriculum revision), 14 (subjects required for graduation), 15 (proportion of student time permitted for electives), 16 (average hours of homework expected), and 17 (types of national examinations and proportions of failure). The theory in each case will undoubtedly vary with the four types of schools.

4. Sub-theories like these will help greatly in identifying the educational features most indicative, on theoretical grounds, of important differences in the character and quality of education. Educational policy-makers would especially welcome the research of social scientists on

these crucial variables and their external relationships. It bears repeating that these variables in particular should be carefully defined in operational terms to facilitate establishing quantitative relations with other variables.

To be complete, we must give some attention to another class of variables associated with education. They have been used, or suggested, as indices of significant educational difference, but they differ from the preceding group in that they seem unrelated to (or unaffected by) the type of school which may be predominant in a region. A few of the most common are listed below. In this case, please encircle for later discussion any items you would remove from the list--i.e., any items you doubt could afford significant comparisons between regions unless the principal type of school in each region were known.

Variables Judged to be Independent of School Type

1. Sources of educational funds (public, private; national, prefecture, local; kinds of taxes)

2. Proportion of labor force in occupation of teaching

3. Ratio of administrators to teachers

4. Ratio of teachers to pupils

5. Ratio of male teachers to female teachers

6. Years of teaching experience (Index of competence? Index of flexibility?)

7. Age of teachers (including average beginning age)

8. Annual teacher turn-over (job-shifts and withdrawal from the profession)

Again the significance of these items has not been well established empirically, and they need the same kind of treatment as was recommended above for the items on the first list, especially incorporation into a cogent theory of educational significance. However, there is some doubt that these latter items are important signs of the character and quality of a region's schooling. Rather they may be more indicative of such social, economic, and political facts as the degree of government concern for education, the competitive economic position of the teaching occupation compared with other occupations, the professional strength of teachers' organizations, the popularity of teaching (in relation to sex and to job opportunities), and the appeal of teaching as a life-long career. In these dimensions we can, and should, expect the greatest contributions from the social scientists, not only in empirical evidence but in conceptual definitions and predictive theory.

Chapter 3

RESEARCHING THE VALIDITY OF THE TYPES OF SCHOOLING

Identifying the types in practice. Each of the above four types of instruction has been made as theoretically pure as possible in order to maximize the contrasts with other types. We can hardly expect to find an entire school expressing a single type purely--in fact, any given teacher in a classroom is not likely to be invariably faithful to one type all year. Approximations are the most we can hope for in practice, so we must be content with main trends and predominant tendencies. Whether all the junior high schools in a local community, for example, approximate rather closely one type of instruction can be settled soon by direct inspection. But what are the prospects that all the junior high schools in a nation can be subsumed under one type? Is it reasonable to expect that a class of schools in a large geographical area can be approximately characterized by a single type of schooling?

Let us first consider this prospect in connection with the four rationalized types described above. In spite of differences in facilities and teacher personalities, it is not at all rare to find entire school systems with an established reputation for a single, distinctive type of instruction. If we focus on central tendencies, considerable homogeneity is often found when schools of the same grade levels and similar purposes are compared. The academic high schools in a middle-sized American city today are likely to be using predominantly the D-I type of instruction. The vocational secondary schools in Taiwan offer type T instruction rather uniformly. At one time the elementary schools of Burbank, California, were characteristically problem solving in their approach.

But what about schools of mixed types of instruction, in which the style of teaching varies with the nature of the subject matter or with the personality of the teacher? Such schools are probably far more common than schools of a single type, especially in developing nations and in pluralistic cultures. This state of affairs need not be deplored just because it complicates the scientific problem of controlled comparisons. In fact, mixed types may turn out to be highly desirable, in which case it is worthwhile to explore the causal conditions which produce mixed types. They may be most likely to multiply in a region undergoing rapid cultural change, as in the shipyard cities of the Pacific coast during World War II or in Japanese public schools since the War.

Even when schools are of mixed types, there are several ways to identify them for comparisons if certain conditions can be met. One possibility is that two sets of schools have similar mixtures of instructional types--say the D-I in the sciences and type M in the humanities. The fact of the similarity in mixture must be established first, but then

comparisons on other variables become quite meaningful, as much so as if the types were pure. Another possibility occurs if the variations in instructional types in one school system appear to cover virtually every type in every subject and thus qualify to be described as randomly distributed. Two schools with randomly distributed mixtures of instructional types are as similar statistically as schools of the same single type, but again the fact of completely diverse distribution must be established first. Only the largest schools and school systems are likely to afford the great variety of conditions and causes required by the logic of random distribution.

Applied to international comparisons of school systems, this analysis makes it possible in principle to recognize several additional types of schooling. One classification can be called "subject mixtures," where each type represents similar distributions of certain instructional approaches among the subjects in the curriculum. As suggested above, one mixture could be type D-I in the natural and social sciences and type M in the humanities. Another could be type T in the communication and computation skills, type D-I in the natural sciences, and type P-S in the social sciences. Such mixtures would be difficult to ascertain on a national scale unless detailed reports are regularly compiled and centralized. The prospect of persuading nations to collect such unusual information about their schools is admittedly very remote at present.

Another classification can be called "randon mixtures," in which there is a chance distribution of all possible types of instruction in all subjects of the curriculum. This is not an unreasonable prospect in view of the large numbers of teachers and subjects involved on a national scale, but the assumption of randomness depends on proving, first and independently, the diversity of the distribution of instructional types. A sampling type of survey would probably be necessary to establish the fact of diversity. Incidentally, the random mixture type of schooling is a rational approximation of the assumption noted in the opening pages of this paper and currently used in most international comparisons of educational attainments--that schooling is a homogeneous quality and that any given year of schooling in one country is generally equivalent to that same year in any other country. The assumption of valid for only those countries with a common type of instruction at a given year, even if the type is that statistical artifact, a random mixture.

Questions for further research. We have proposed six types of schooling with which to classify educational systems. Four are derived from rational theories of instruction--memorizing, training, developing the intellect, and problem solving. The fifth, subject mixtures, is a way of patterning different combinations of the first four by subjects, and the sixth, a random mixture, is a way of blending the types together. The theory building has gone far enough. While this typology can still be criticized on logical grounds, it is time to explore its internal dimensions and external connections empirically. The following questions may be suggestive of the kinds that should be raised.

1. How good is the fit of these types of schooling to existing educational programs in the various regions and countries of the world? Answers are needed from qualified observers who are not only familiar with particular school systems but who also understand the theories behind the four rational types. If a single type of schooling on a specified educational level is consistently found to be approximated throughout some regions, then questions can be raised about possible systematic variations within the type when two similarly typed regions are compared. In particular, are certain elements associated with a given type characteristically found in one culture but not in another, although most of the other features of the type are the same? For example, do school programs generally classifiable as intellect developing show important variations from culture to cultu e in the quality or kind of motivation commonly used? Do programs of the memorizing type differ greatly between cultures with respect to the teacher's responsibility for developing certain personality traits in connection with cognitive learning?

If none of the rational types of schooling is found region-wide on a specified educational level, do either of the two mixed types fit the obse ved facts? Pessimistically, are the schools at a given level in some regions such "a mixtu e of mixtures" that none of the six types can be fairly applied? Or, optimistically, are additional types beyond these six required to account for the distinctive practices and internal coherence of some educational programs? A possible candidate is the spare-time adult schools of Communist China. Although precise information is difficult to obtain and more difficult to confirm, it appears that these schools are closer to the sense realism advocated by Comenius in the 17th century than to any of the types described above.

2. How valid are the claims of each rational type of schooling for functional connections between its preferred means and its professed ends? Granted that these relationships have logical plausibility, do they work out empirically as anticipated? Specifically, do the curriculum content and teaching methods recommended actually produce the anticipated outcomes?

Here is where professional educators have much postponed empirical work to do. The educational features which they consider significant on theoretical grounds are better than no proposal at all, but social scientists will be justifiably unwilling to accept the conclusions of prescriptive theory as substitutes for tested evidence. The claims of these theories need to be expressed in operational or behavioral terms and then factual data collected on their efficacy. Where empirical knowledge does not exist (or is confused with "expert opinion"), controlled research should be undertaken.

3. Are there a few critical factors within each type of schooling that distinguish each from the others at least as clearly as the complete type descriptions do now? The hazard of attempting to answer this question is the difficulty of lifting out parts of a coherent pattern without distorting their meaning and significance--the old problem of taking things out of context. For instance, the principle that knowledge is demonstrated by performance is common to both the training type and the problem-solving type, but in the first case it refers to an habituated skill and in the second to ideas tested in action.

The advantage of answering this question is the brevity or economy achieved. If a few factors can ge identified which, when taken together, serve as reliable and unambiguous clues to the entire character of the instructional type, much time can be saved and the procedure for classifying schools in a given region can be greatly simplified. Difficult as this task may appear to be now, presistent analyzing and testing will probably accomplish it. The fate of all typologies, the history of the science shows, is to be superseded by simpler, more sensitive variables.

4. In what ways can the approximation of a region-wide level of of schooling to one of the instructional types be indicated? The answer to this question depends on the solutions to a series of sub-problems. First, what are the conditions and personnel for making obersvations? If inspection of individual schools is not feasible, reliance may have to be placed on the general impressions of knowledgeable and experienced observers long familiar with the country. If mobile and competent observers are available, specific schools can be visited and appraised on a schedule of particular features.

Second, what content will be sought from the observations? If the content is a classifying judgment, as would be necessary when only general impressions are used, it is easy to persuade the judges to overlook exceptions and limit their summarizing impressions to one or two of the six types. The objectivity of such judgments could be sought through some percentage of agreement, say 75 percent, among the judges. If the content desired is specific observations, as could be provided from inspections of individual schools, then these observations could be scored and weighted so that the instructional type could be established by some sort of numerical treatment.

A third sub-problem is whether to treat the judgments or observations dichotomously--i.e., as either belonging or not belonging to a specified type--or to treat them in terms of degrees of approximation to a type. Degrees of approximation could be obtained eigher from general judgments ("very close," "moderately close," "some tendency") or from numerical scores, but it is doubtful whether they should be sought unless the techniques of observing and judging are sufficiently precise to justify such refinement.

5. What pedagogical conditions are especially influential in enhancing or diminishing the effective operation of each type of schooling in actual practice? This question submits the theoretical integrity of each of the four rational types to the empirical impact of special conditions. Several possibilities can be suggested. For instance, could the enthusiasm and magnetism of a teacher's personality change a memorizing type curriculum into an intellect-developing type? Or could the single factor of a radical difference in the kinds of classroom discipline employed make a significant difference in the kinds of outcomes achieved? Along another line, could a subject which functions well in a training curriculum or an intellect-developing curriculum in some school systems because only a memorizing activity when transferred unchanged to another school system? This appears

to be the case when the New Zealand subject of sheep farming is literally transposed to the high school curriculum of Western Samoa (where there are no sheep) to prepare Samoan students for New Zealand college admission examinations. Finally, even if most students in a given region should happen to perform better in a problem-solving curriculum, it is possible that the twenth percent of students who are most academic minded would still perform better in an intellect-developing curriculum even when judged by the anticipated outcomes of the problem-solving school?

6. What conditions, largely external to the school (e.g., economic, political, and cultural), are especially influential in developing and maintaining each instructional type? This question invites intensive case studies of easily typed school systems in clearly market social contexts. On a national basis, the "public" schools of England and the folk high schools of Denmark provide good examples. Regionally, promising cases can be found in the private preparatory schools of New England and in the "progressive" schools around university centers in the middle western and far western parts of the United States. Other examples should be sought, of course, in Latin America and Asia, but the surrounding social conditions need to be stable enough to permit the identification and testing of generalizations.

7. What characteristics of a society--economic, political, and cultural--appear to be associated, in ways that suggest consequential relationships, with long-established schools of a distinctive type? This question has the greatest import for educational planning but is, of course, the most difficult to answer. The causes of a society's characteristics are multiple and complexly related, and the role of the school system in this combination of factors could vary from major producer, to catalyst, to elegant decorator. The wording of the question suggests how little knowledge of causal combinations can be expected in the near future. However, the rapid increase in the number of trained observers who are now studying school systems in a great variety of national cultures is likely to produce many new research controls as well as new hypotheses. The chief problem may turn out to be the difficulty of finding a distinctive type of schooling operating over a sufficiently long period in a given society to have the long-run effects which researchers seek to identify.

When the operation of each of these types of schooling has been studied under a variety of socio-economic conditions, reasonable hypotheses may be inferred regarding the probable effects of introducing a different type of schooling into a given society. Then such questions as the following could be answered: Which type of schooling of the common people is the most often associated, under specified socio-economic conditions, with readiness for change? With resistance to change? With abrupt or revolutionary change? With stable and continuous change? Which type of schooling at advanced levels for the selected few is most often associated, under specified socio-economic conditions with autocratic leadership? Freely circulating leadership? Self-reliant entrepreneurs? A discontented intellectual class? Rebellions and revolutions? Under specified conditions, what influences

does each type of schooling appear to have on a caste system? On social class structure? On the authority of parents? On the authority of the church? On juvenile delinquency? On divorce rates? On the demand for civil liberties? on Chauvinistic nationalism? On traditional moral standards?

Chapter 4

RELATING TYPES OF SCHOOLING TO NATIONAL DEVELOPMENT VARIABLES

Significant dimensions on which national societies differ. While the answers to the questions raised in the preceding section must depend on careful empirical studies, we need hypotheses to guide the investigations. One set of hypotheses will concern the social and cultural factors that are most closely related to the uses of education for national development. But before these hypotheses can be formulated, we need to identify some significant dimensions on which national societies differ, especially those which are most likely to affect, or be affected by, different types of schooling. Some examples of this important kind of national differences are proposed below:

1. From a predominantly rural, manual-labor community to a predominantly urban, technological economy.

2. From a cultural resistance to technological change to cultural eagerness for technological advancement.

3. From cultural homogeneity to cultural heterogeneity (including racial and ethnic composition as well as plural economic systems, religions, castes, etc.)

4. From commitment to cultural conformance to commitment to cultural pluralism.

5. From rigid social stratification to fluid social stratification.

6. From highly centralized political power to widely decentralized political power.

7. From autocratic control of schooling to popular control of schooling.

8. From concern with educating only an elite to concern for mass education.

Hypothetical Relations of Types of Schooling to these Dimensions. If the four types of schooling outlined earlier turn out to have a considerable degree of empirical validity in national settings, then studies can be undertaken of their distinctive relationships to school, economic, and cultural variables like the eight listed above. The following sets of hypotheses are merely speculative, drawn from unsystematic impressions, but they are plausible and may be suggestive of the rich variety of hypotheses that can guide later research when cogent theories are developed first.

M TYPE SCHOOLING

Preliminary hypotheses:

1. This type of schooling is not intended to produce competent activitists in the economic and political life of the society. Its major concern is with the cultivating the inner life of the mind. Its connection with the world of action is largely to serve as a screen or hurdle to be passed before one is admitted to positions of responsibility. Hence, it should not be judged for a possible functional contribution to one's performance in the active world.

2. Useful in mass education for preserving the beliefs, history, and literature of the nation.

3. Useful in mass education for cultivating traits of obedience, reverence of the past, intellectual conformance, deference to elders.

4. If successful memorizing is more a function of effort and persistence than of native ability, M type schooling for all appeals to the common people as egalitarian in spirit and offering equal opportunity for advanced schooling. Hence, enhances vertical social mobility when schooling is a major index of employment and social status.

5. If only the elite receive formal education, M type not only fits the genteel tradition of this class but lies within the capacity of all elite children to master.

6. No direct contribution to developing either leaders or consumers of technological change. May create resistance to technological advancement.

7. Useful in mass education for making heterogeneous groups more homogeneous ("melting pot" policy); unlikely to promote cultural pluralism.

8. Least demanding of all types on teacher preparation; hence, it is the easiest type for which to supply adequate teachers.

9. Neither the teachers nor the students are likely to become critics of the existing social order as a result of M type schooling.

10. The least expensive of the four types, because it requires so little in learning materials (and need not require extensive teacher preparation).

11. Accommodates indifferently to highly centralized political power and to widely decentralized political power.

12. Accommodates indifferently to autocratic control of schooling and to popular control of schooling.

13. Adapts readily to quantitative individual differences (slow and fast learners), but tends to ignore or eliminate qualitative individual differences (in interests or special talents). Hence, it is most efficient for obtaining standardized outcomes with homogeneous groups of students; it is not efficient for obtaining varied outcomes with heterogeneous groups of students.

T TYPE SCHOOLING

Preliminary hypotheses:

1. This type of schooling is exclusively intended to equip one for the active world, whether in moral behavior, civic behavior, or vocational performance. The trained person has some specific understanding of what he is about, but the stress is on skilled performance. He may understand the task but not the occupation; he may understand the economics of his job but not the economics of his labor market.

2. For elite education, it is efficient in teaching the non-intellectual aspects of schooling--e.g., character training (as in Public Schools of England), sports skills, art skills, public speaking, etiquette.

3. At its best, it cultivates attitudes of precision, fidelity to models, and high standards of workmanship.

4. When applied to vocational preparation and offered as an alternative to general academic schooling, it has mass appeal for its practical orientation. (This practical appeal, however, may be more than counter-balanced by the prestige appeal of academic school and the genteel occupations popularly associated with the latter).

5. Facilitates vertical social mobility only from the lower class to the middle class--i.e., from employment in unskilled and semi-skilled occupations to employment in skilled and commercial occupations.

6. Often believed to be socially degrading because it involves so much practical use of physical skills and so little use of ideas and abstractions.

7. Commonly associated with vocational programs that terminate schooling at a young age. Children of the elite customarily avoid such programs, while children from the working class usually fill them thus producing in effect a segregated education by economic status.

8. Seldom produces innovating leaders of technological change, but may be used to train followers for fixed types of new roles in the emerging social order. Thus, T type schooling can promote needed vocational skills and consumer attitudes for technological advances but without providing understanding and control of the new society by the recipients of this training.

9. Probably the most efficient method for quick results in basic literacy, habits of sanitation, voting procedures, etc., especially in adult education.

10. Useful in mass education for making heterogeneous groups more homogeneous ("melting pot" policy); unlikely to promote cultural pluralism, although it could provide the minimal homogeneity needed for cultural pluralism.

11. Usually demands teachers with practical experience from employment in the fields taught. Hence, teacher recruitment is commonly in direct competition with employment in these other fields.

12. Neither the teachers nor the students are likely to become critics of the existing social order as a result of T type schooling (except when unemployment of trained graduates is high).

13. Can be one of the most expensive to operate of the four types, because of the consumable supplies and training equipment required.

14. The easiest type of schooling to justify in terms of measurable results of economic value.

15. The easiest type of schooling to turn over to non-professionals for the selection of curriculum content. Selected adult activities can be analyzed for the neded skills and attitudes to be learned by students, and each set of skills can be broken into its elemental components for separate treatment.

16. T type schooling is one of the two (P-S type is the other) which are most susceptible to public evaluation, criticism. The public participation, however, can range from cooperation to interference.

17. Probably accommodates somewhat better to autocratic control of schooling than to decentralized, popular control of schooling.

18. Adapts readily to quantitative individual differences (slow and fast learners), but tends to ignore or eliminate qualitative individual differences (in interests or special talents). Hence, it is most efficient for obtaining varied outcomes with heterogeneous groups of students.

D-I TYPE SCHOOLING

Preliminary hypotheses:

1. D-I type schooling stresses the learning of subject matter organized into disciplines (geography, history, botany) and basic skills (reading, spelling). The curriculum content consists largely of concepts, generalizations, theory, and knowledge-about. The students are expected to memorize essential ideas, organize them systematically, and use them effectively in further analyses and interpretations of the subject matter under study. This schooling is claimed to be good for all educable students because it gives them some acquaintance with the organized subjects underlying all knowledge, and also develops and disciplines their minds.

2. Probably 20-30 percent of normal children become interested in learning this kind of knowledge for its own sake. The rest of the school-age population commonly see little use in it (except when it derives directly from problems they have experiences) and hence require extraneous motivation to do this kind of study.

3. Students who find no intrinsic motivation in their study and who become unresponsive eventually to extraneous motivation should be allowed to drop out of school(or be transferred to another type of schooling). If they are not allowed to drop out, the standards of the D-I schooling suffer and tend to deteriorate to the M-type standards.

4. D-I type schooling can produce an adequate proportion of leaders if the upper strata having access to it contain enough children who can profit from it. This type of schooling is not appropriate for mass education, for it either forces a high drop-out rate or tends to degenerate into M-type schooling.

5. The successful graduates of D-I schooling are characterized by (a) academically intellectual interests, (b) research interests, or (c) habitual motivation for extraneous rewards. Since these graduates constitute the professional and managerial leadership of most industrialized, technologically advanced socities, these interests tend to predominate in such societies.

6. Since the curriculum of D-I schooling is usually fixed in advance, equal educational opportunity tends to be expressed as identical educational opportunity.

7. When economic barriers are equalized, this schooling facilitates vertical social mobility for students with any of the three motivations noted in #5.

8. Because of its intrinsic non-utilitarian character and its intrinsic difficulty, this type of schooling is unappealing to most school-age children. However, (and partly for these reasons) Western cultures generally credit this type of schooling with inherent worth and high prestige.

9. In societies where this schooling predominates, pure scholarship and research tend to be regarded as important social values.

10. The supply of teachers for this kind of schooling, especially at the secondary and higher levels, is drawn largely from those students who enjoy mastering a subject for its own sake but who are often not competent nor interested in its practical applications (also true of M-type teachers).

11. Since this type of schooling aims at understanding more than the development of practical skills, two hypotheses follow:

a. The practical effects on the competence of graduates (or school-leavers) in such adult activities as politics, occupations, consumership, family adjustment, and recreation are difficult, if not impossible, to identify within the first decade after leaving school. (This is not to deny that many such graduates will be given access to choice occupations and higher earning power for prestigious reasons, but these reasons are functionally unrelated to their academic studies).

b. Since this type of schooling approaches its goals through classroom tasks that require very little direct experience in the major activities of adult life, the education thus received needs to be followed by considerable practical training before the student is competent for employment or successful performance in the relevant adult activities.

12. D-I schooling demands freedom of intellectual inquiry and debate, but is seldom responsible for producing activist critics of the existing social order.

13. Shares with M-type schooling the distinction of having scholars (college professors) in predominant control of the curriculum.

14. Is resistent to propagandistic uses of education, even though it can adapt readily to an autocratic form of school organization.

P-S TYPE SCHOOLING

Preliminary hypotheses:

1. Education through problem solving conceives a problem broadly as any desired satisfaction which cannot be obtained merely by wishing, regards student interests as a necessary though not sufficient guide to curriculum construction, insists that knowledge is obtained only by acting on ideas, and contends that a command of organized subject matter is the end point rather than the starting point of sound schooling.

2. The general methodology of this type of schooling is appropriate and attractive to all ranges of student ability at all grade levels.

3. Learning achieved through the intrinsic motivation of problem solving is more enduring and more widely applied than learning from extraneous motivation.

4. The most likely type of schooling to produce activists and critics of the social order without resort to propaganda.

5. Is antithetical to hypocrisy, because the worth of every social standard and institution is judged, not by its inherent value, but by its consequential relationships to other social concerns and interests. Students receiving such schooling are likely to be pragmatic in judging values and critical of hypocrisy.

6. Has the greatest difficult of all schooling types in securing competent teachers, since it demands teachers with as much practical experience as those in T-type schooling and with even deeper scholarship than those in D-I schooling. Moreover, since the demands on the teacher become increasingly greater as the level of schooling advances, most examples of competent instruction in P-S schooling in the elementary grades.

7. Encourages homogenity in the method of identifying and solving problems but heterogeneity (cultural pluralism) in tastes, standards, and ideals.

8. Promotes multiple channels for achieving success through problem solving instead of rewarding merely verbal and conceptual achievements. Hence, qualitative differences (in interests or special talents) among students are sought and developed.

9. Encourages, by the nature of the problem-solving process, a great degree of innovation and creative variation, not only among students but also among teachers. Hence, this type of schooling is the least predictable in the particular knowledge the students will acquire and the least conforming to autocratic administration.

10. The most likely type to develop leadership in close conjunction with followership.

11. Encourages the study of traditional values and beliefs only in the context of how they may contribute to more satisfying living today.

12. The most likely type to develop both creators and consumers of technological change.

13. The most likely type to extend intellectual understanding and critical choice to all aspects of living--occupations, consumership, politics, recreation, family affairs, religion, etc.

14. Promotes an egalitarian respect for individuals and a fluid social structure through its extensive dependence on student-defined interests and problems.

15. Invites a high degree of cooperative participation by the public in identifying significant problems for study, providing resource materials, and appraising the results achieved.

16. Progress toward the central goal (competence and confidence in problem solving) can be readily appraised in new, genuinely problematic situations, but paper-and-pencil tests appraise such progress only indirectly and with less reliability.

17. Much direct experience is advocated to develop the students' skill in problem definition, to enhance the prospects of intrinsic motivation, and to promote insights for wider applications.

18. Because of its practical nature and its appeal to intrinsic interests, this type of schooling is most likely to prepare for continuous change and least likely to alienate youth from the concerns of an urbanized, industrial society.

Conclusion. This essay has been an exercise in constructing theories and project hypotheses. The purpose of the theory construction was to make the concept of formal education a more meaningful variable in studies of the political, economic, and social uses of schooling for national development. The four types of schooling presented need to have their distinctive claims validated empirically, but in the meantime their logical coherence offers better variables for social science research than the undifferentiated conception of education has. The purpose of projecting hypotheses was not only to demonstrate the fruitfulness of the theories presented but also to stimulate the composition of alternative hypotheses and systematic efforts to verify or falsify all such hypotheses.

These are tasks that command the teamwork of professional educators and social scientists. Together they can create an implied science in the uses of education for human resource development and national modernization.